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DEPARTMENT OF AGRONOMY  
BRADFIELD AND EMERSON HALLS

April 14, 1969

Dr. Joshua Lederberg  
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Dear Joshua:

In explaining my slow reply to your letter of March 27, I am presently on sabbatical leave and only rarely come to the office for mail and to tend to administrative matters.

Several months ago, we moved from our old quarters to a new building. In the move, I went through a considerable amount of material that I had accumulated during the past few years. The deliberations of the P.S.A.C. panel on environmental pollution resulted in a tremendous quantity of material, which I went through shortly before the move in order to discard that which seemed to be creating no public interest. Unfortunately, the chlorination material that Dr. D. O'Bryan and I accumulated fell into this category. From the time that the P.S.A.C. panel terminated its activities until your letter, I had not a single request for information on the chlorination of wastes and potable water.

My answer to your queries, therefore, will have to be based solely upon my memory. You might, however, be able to obtain the original documentation that we gathered from Dr. D. O'Bryan who is with the U. S. Geological Survey, U. S. Department of the Interior, Washington, or from the U. S. Office of Science and Technology, Executive Office of the President; John Buckley was the O.S.T. staff man.

I do not remember any work done on the chemistry of the products of chlorination of potable water, except as related to the widespread observations (but no chemistry) in regard to the chlorination of phenols. The phenols attract attention because of the low threshold level of these compounds for taste or smell. Water organic chemistry has been a largely unexplored field, except for the recent upsurge of interest resulting from concern with the contamination of potable and recreational water with pesticides. I feel, and felt earlier, that much more chemistry needs to be done on some of the trace synthetic or natural materials that occur in water, particularly as related to chlorination, especially in light of the fact that many chlorinated compounds are effective pesticides and might have an effect upon humans as well. Although these may pose a possible hazard, there was no information brought to our attention that there are sensitive individuals

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or relative to epidemiological evidence suggesting an effect of chlorinated water on the human consumer.

I am not acquainted with the standards for residual chlorine in tapwater; indeed I am not sure whether such standards exist in view of the fact, as you point out, that one can smell or taste the chlorine added to water. I would assume that some toxicology has been done but I am not aware of any data. Possibly Dr. Paul Kotin, Director, National Institute of Environmental Health Sciences, North Carolina Research Triangle, can provide you with some information on this matter. Clearly, the chlorine level is noxious to at least some people, but whether these levels are merely obnoxious or whether they are harmful I am not in a position to say.

Little on the uptake and body distribution of hypochlorite came to our attention.

I am not sure what you mean by the influence of chlorination on essential nutrients. I would be somewhat surprised to learn that halogenation, as routinely practiced, did have an effect on the nutrients of the aquatic flora since chlorine is probably largely lost before the potable water that has been treated returns to the natural body of water. There may be some effect of chlorination on human nutrients, but to my knowledge, this has not been investigated and has not been a matter of concern.

I apologize for the lack of information in this letter. However, I think I can paraphrase the heading of your March 15 story, namely, that our own review on the possible effects of chlorination points to a lack of basic knowledge. I am sure that Dr. O'Bryan and Dr. John Geyer, the other participants in the subpanel, would agree with me that surprisingly little has been done on the influence of chlorination on natural or synthetic materials that are in potable water. The lack of concern undoubtedly is associated with the absence of any evidence for an untoward effect upon man, but no harm would be done to have a continuing, but modestly financed, survey in view of the near universal use of chlorination for municipal, suburban and rural water supplies.

Sincerely yours,



M. Alexander  
Professor  
Soil Microbiology

MA/dm